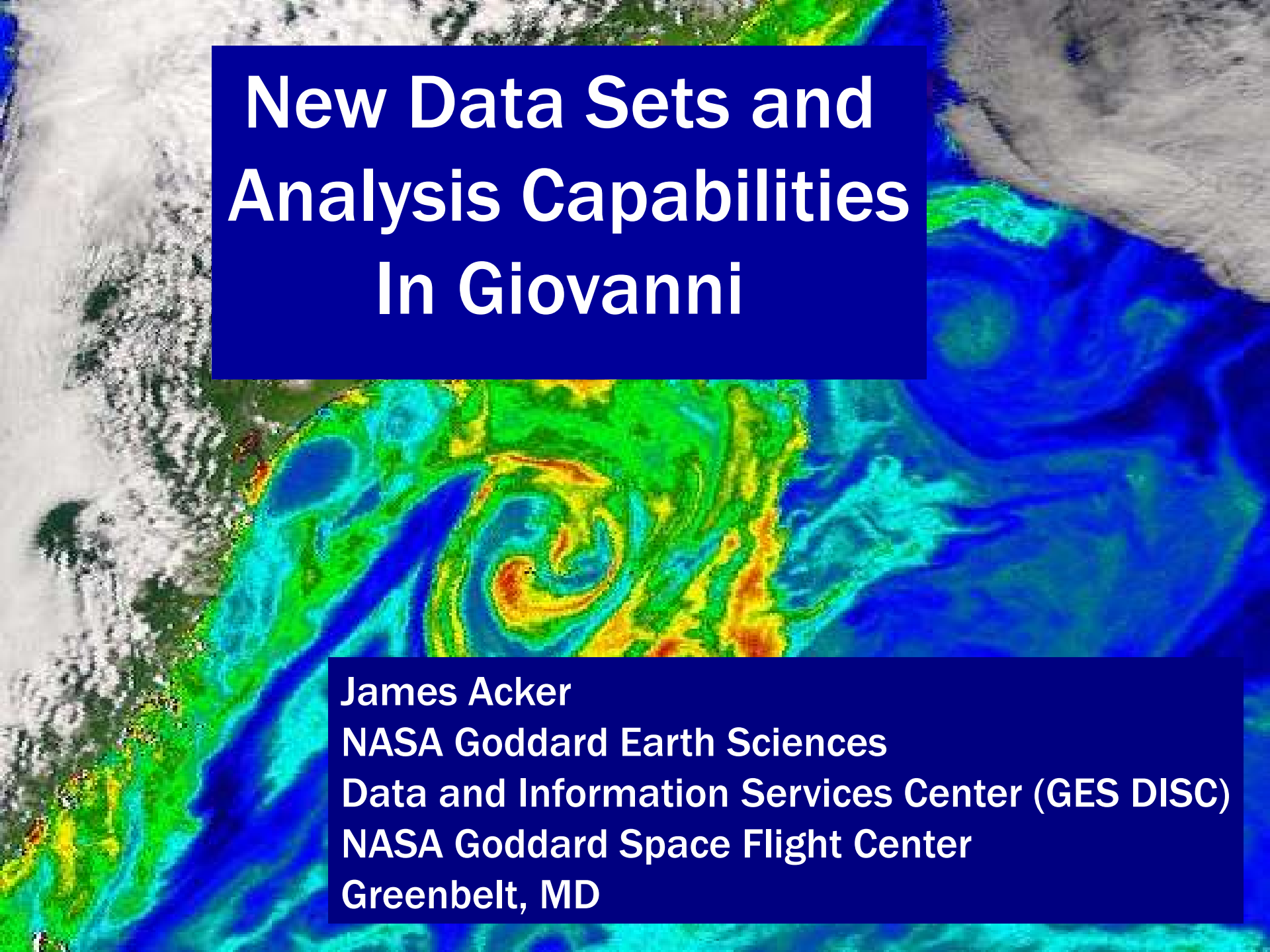

New Data Sets and Analysis Capabilities In Giovanni

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NASA Goddard Earth Sciences
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What is the Giovanni system?

Giovanni is a Web-based data exploration system that enables rapid data access, analysis, and visualization online – users do not have to download data files to their own system before initiating analysis and research

Giovanni's Ocean Color Radiometry interface contains data from the SeaWiFS and MODIS-Aqua missions, and derived data products; other Giovanni interfaces have data from other satellite missions, and supplemental data sets

So what does ‘Giovanni’ stand for?

Giovanni stands for

- GES DISC
- Interactive
- Online
- Visualization
- ANd
- aNalysis
- Infrastructure

The current Giovanni evolved from an earlier prototype system.

The current system *had* been called “Giovanni-3”; now we just call it Giovanni.

Some images in this presentation were generated by the older system; the current Giovanni has better graphics quality and additional plotting capabilities.

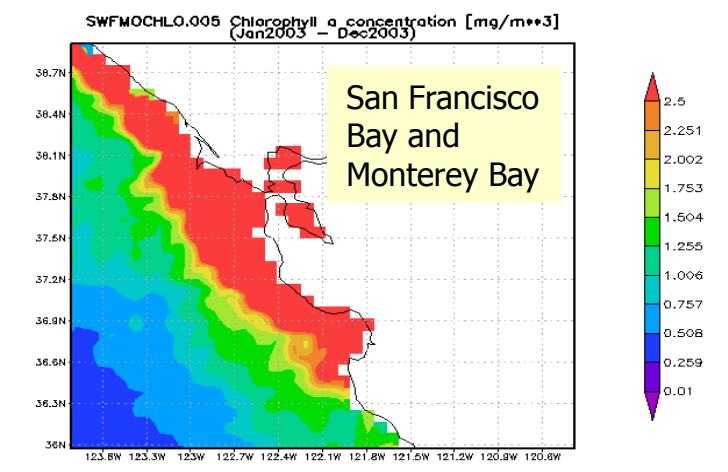
Brief description of the Giovanni system

The main components of the Giovanni system are:

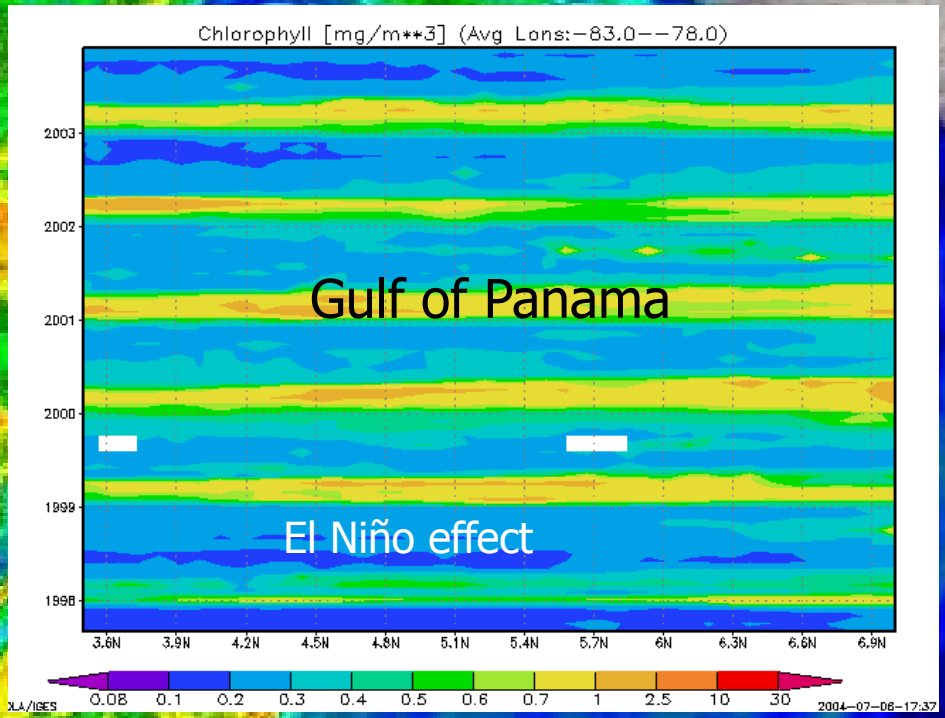
- an interactive map for region-of-interest selection;
- a menu of available data products;
- a calendar menu for time-period selection;
- a menu of visualization options;
- visualization-specific options (color palette, axis values)
- menu of output options

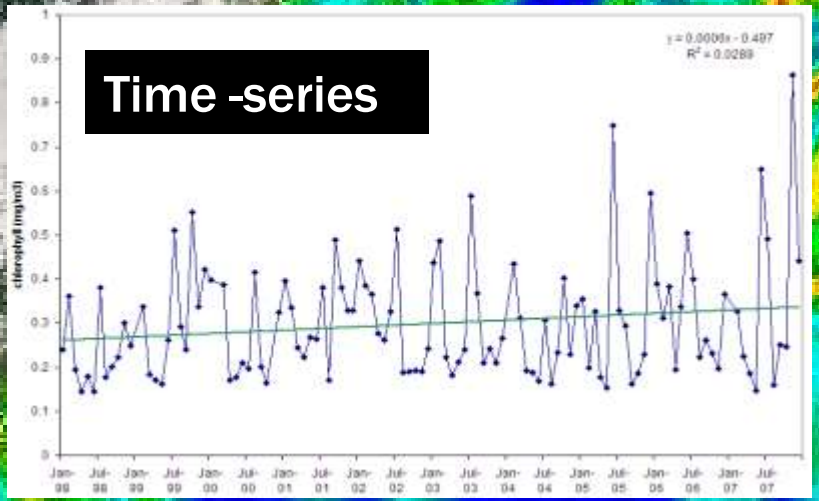
Giovanni output types

Area plot (lat-lon map)



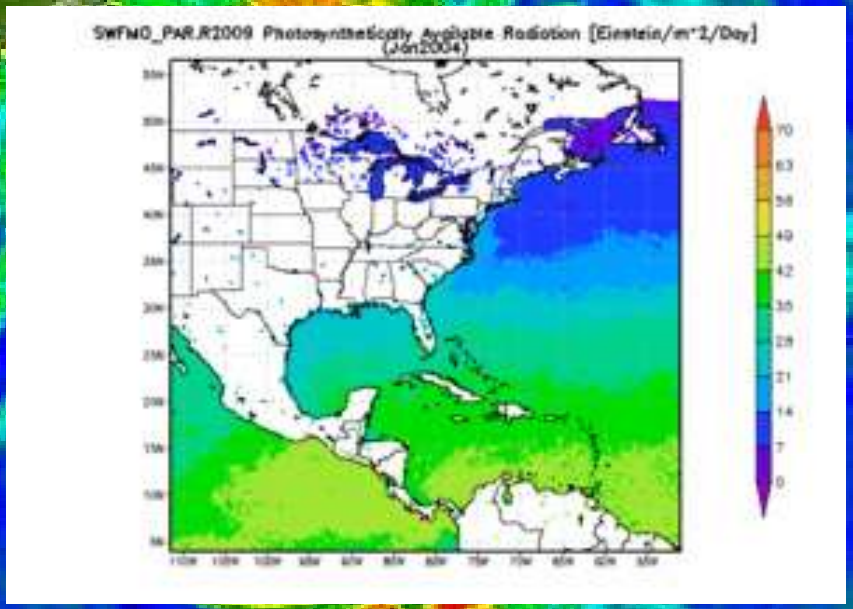
Hövmoller plots – ideal for visualization of seasonal signals





Giovanni provides output as ASCII, HDF, and KMZ (Google) Earth) files

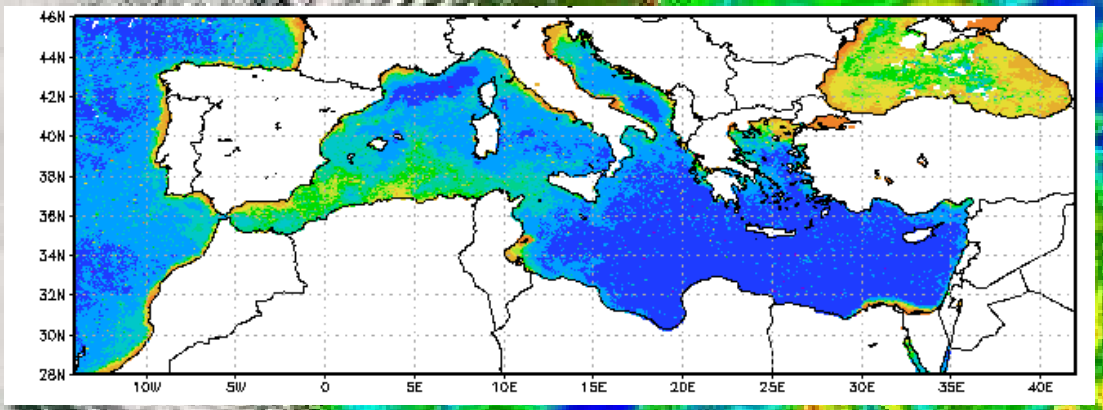
Animations
display successive area plots



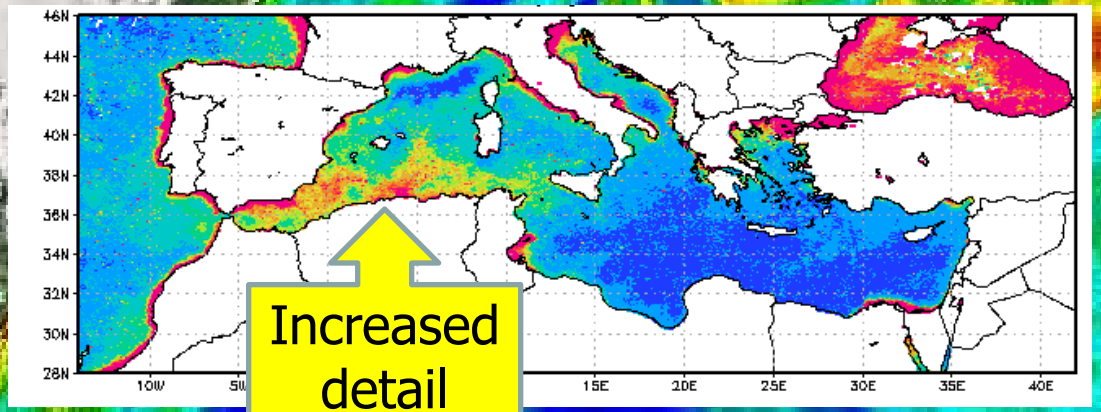
New data product –
SeaWiFS PAR

Giovanni output types:
Visualization-specific options

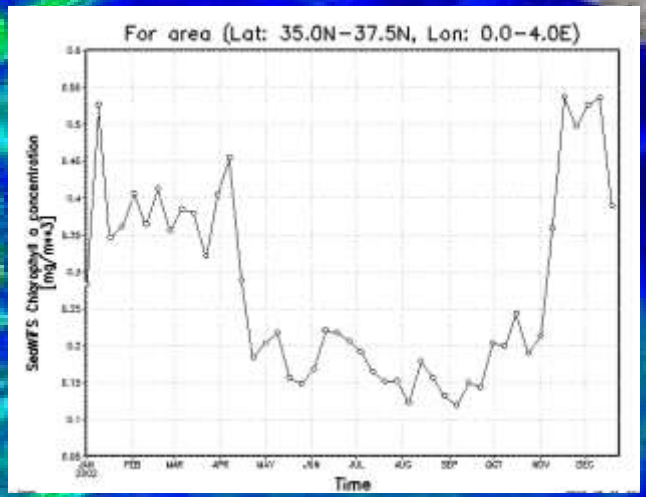
Pre-defined color palette

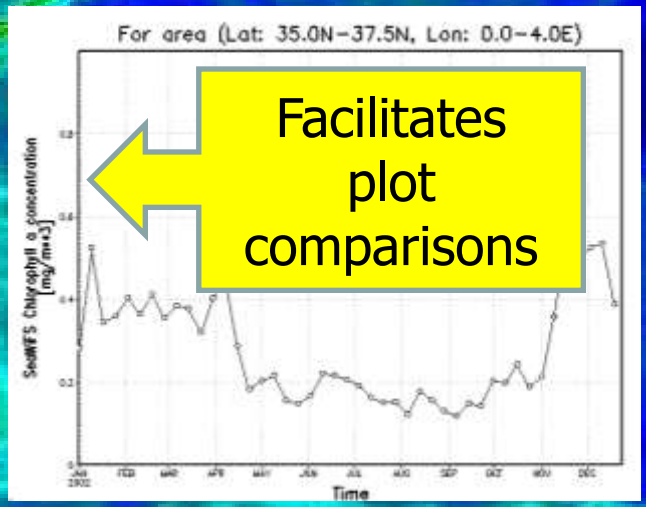


Customized color palette



Y-axis customization



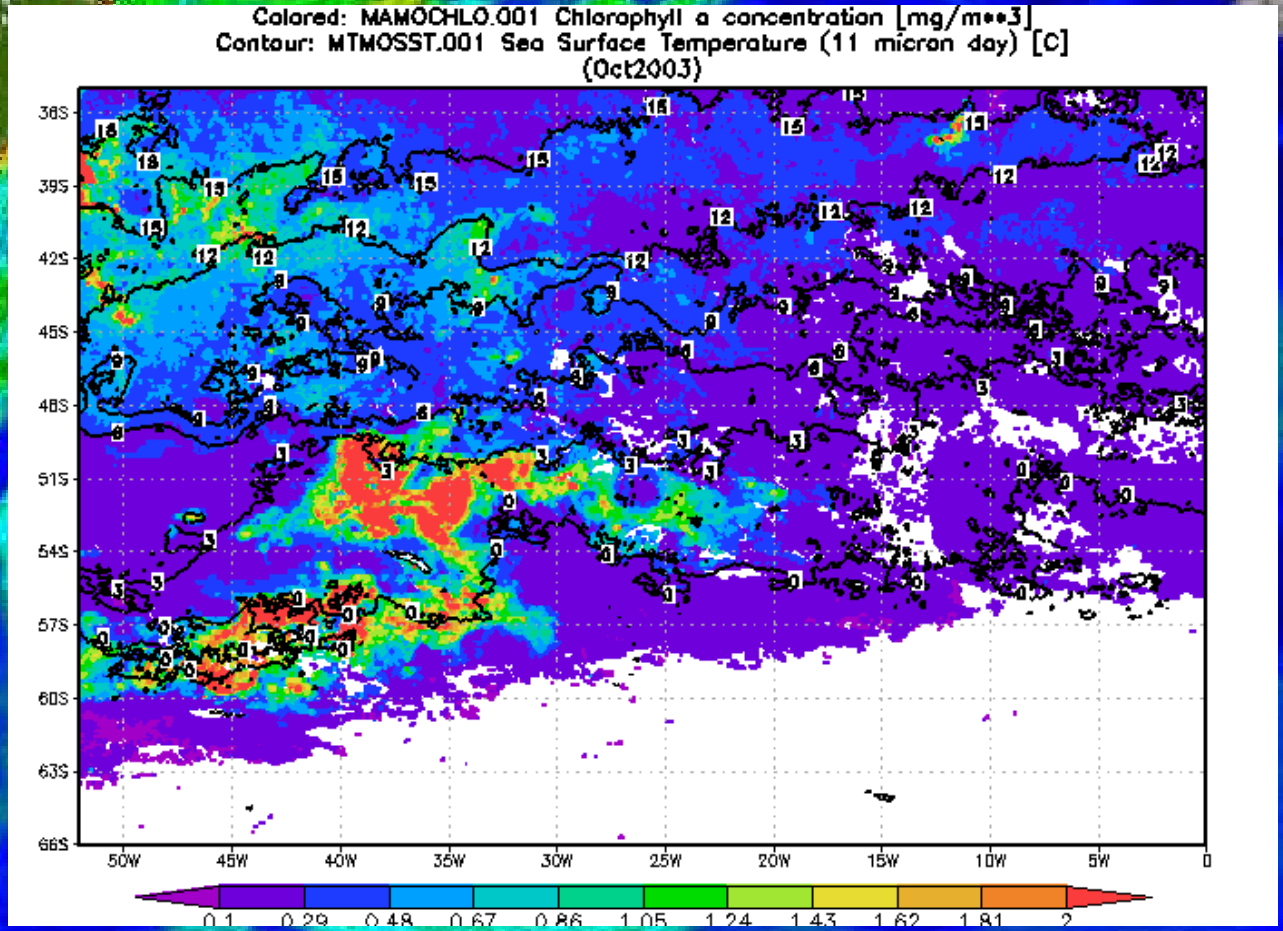


Giovanni output types

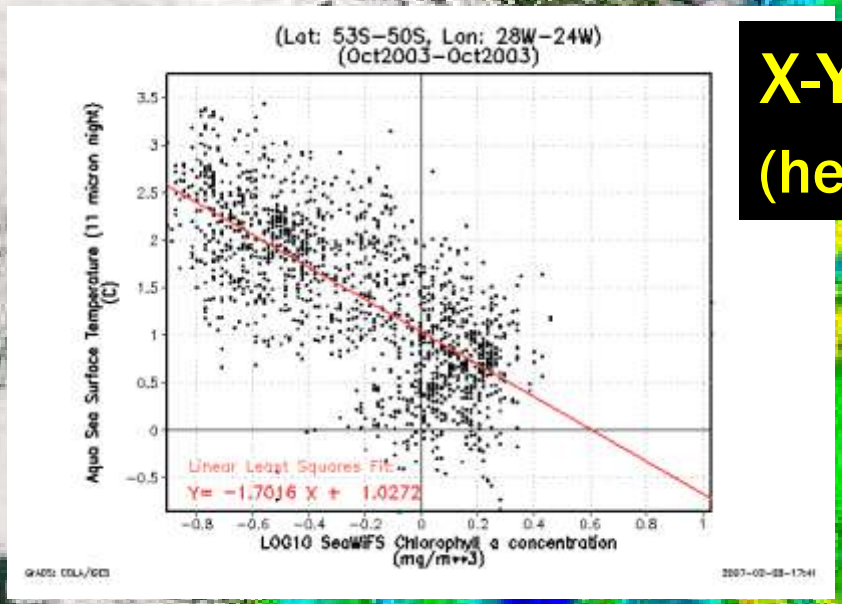
Overlay plot

Multiple data product area plot:

Sea surface temperature (contours) and chlorophyll concentration (color scale)



More Giovanni output types

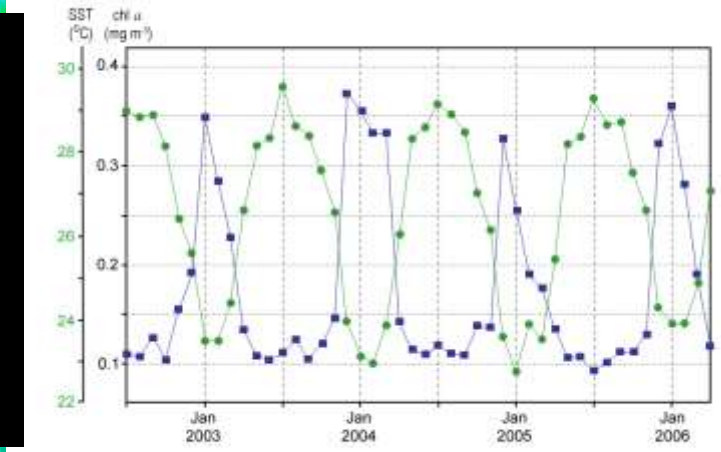


X-Y scatter plots

(here, SST vs. chlorophyll)

Multiple data product time-series

(here, SST vs. chlorophyll, in a Giovanni output figure adapted for publication)



Data products in Giovanni

Ocean Color Giovanni currently provides these oceanographic data products for visualization and analysis:

- Chlorophyll concentration
- Diffuse attenuation coefficient at 490 nm
- SeaWiFS and MODIS normalized-water leaving radiances (see Note)
- Absorption coefficient of dissolved and detrital matter at 443 nm
- Particulate backscatter coefficient at 443 nm
- Sea surface temperature (MODIS)
- Assimilated chlorophyll and other output fields from the NASA Ocean Biogeochemical Model (NOBM)

Note: New data products from the most recent SeaWiFS data reprocessing are *remote-sensing reflectance*, not water-leaving radiance.

New SeaWiFS data products!

- ✓ Particulate Organic Carbon (POC)
- ✓ Particulate Inorganic Carbon (PIC)
- ✓ Photosynthetically Available Radiation (PAR)

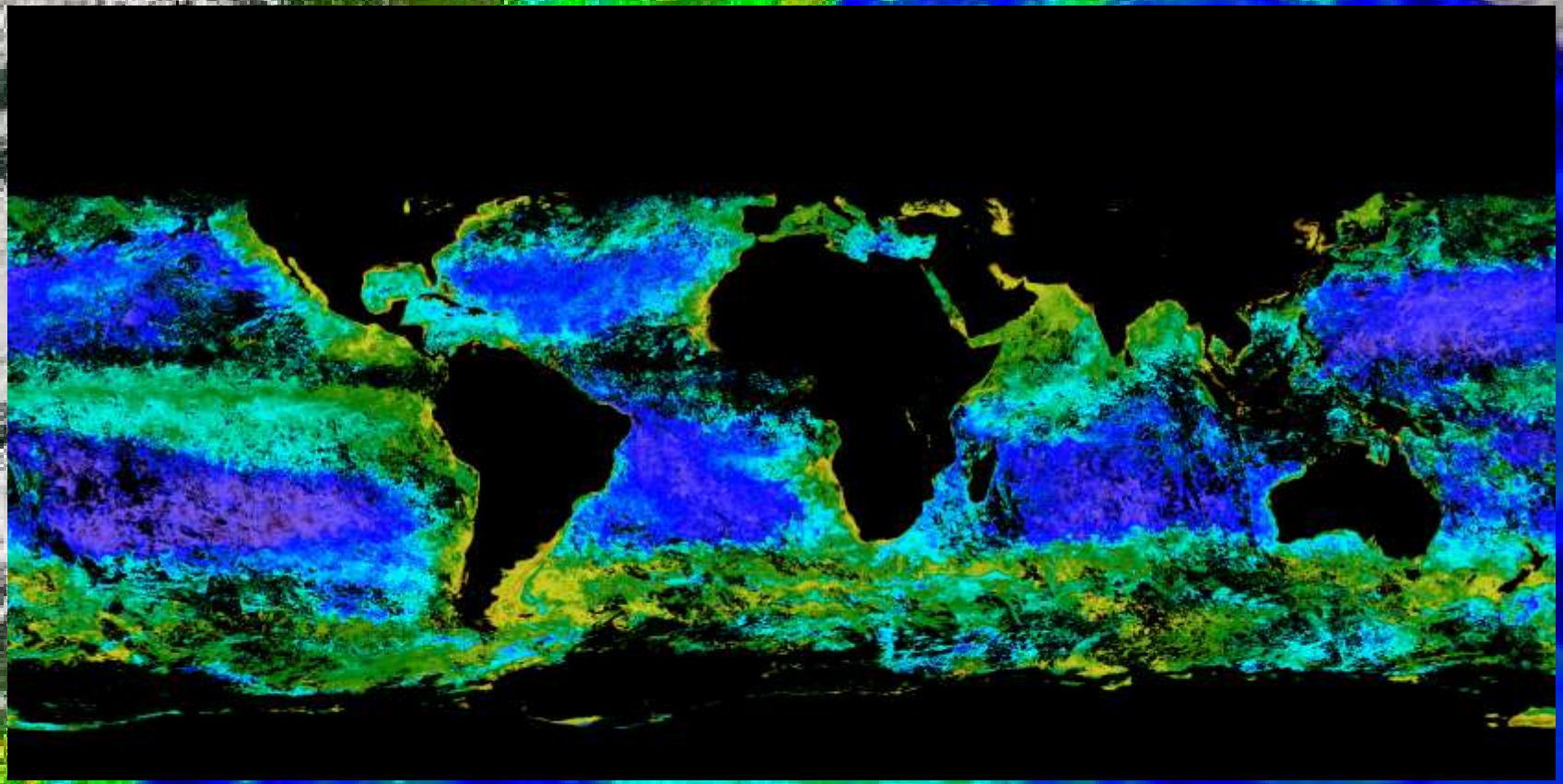
Data products provided by the GSFC Ocean Biology Processing Group (OBPG)

New MODIS-Aqua data products!

When the MODIS-Aqua data reprocessing is completed, we will be adding new data products to Giovanni, including:

- Euphotic Depth (Z_{eu})
- Calcite
- MODIS-Aqua PAR
- Others???

Euphotic Depth
December 2007

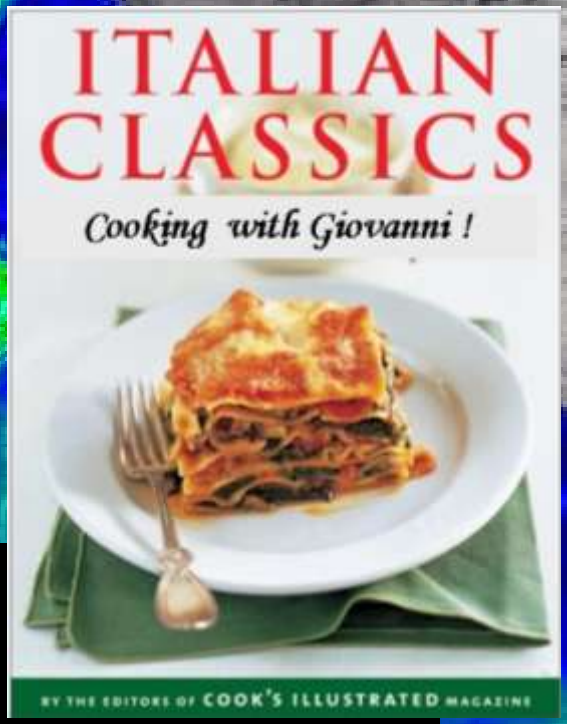


New visualization and analysis capabilities (in development)

- Histogram (frequency distribution – available now!)
- Transect plot (data along a user-generated line)
- Point data (select any point in the plot and see the location and data value)

These demonstration capabilities are part of our NASA Water Quality Project activities (Zhongping Lee, PI)

Where to find Giovanni !



Giovanni:

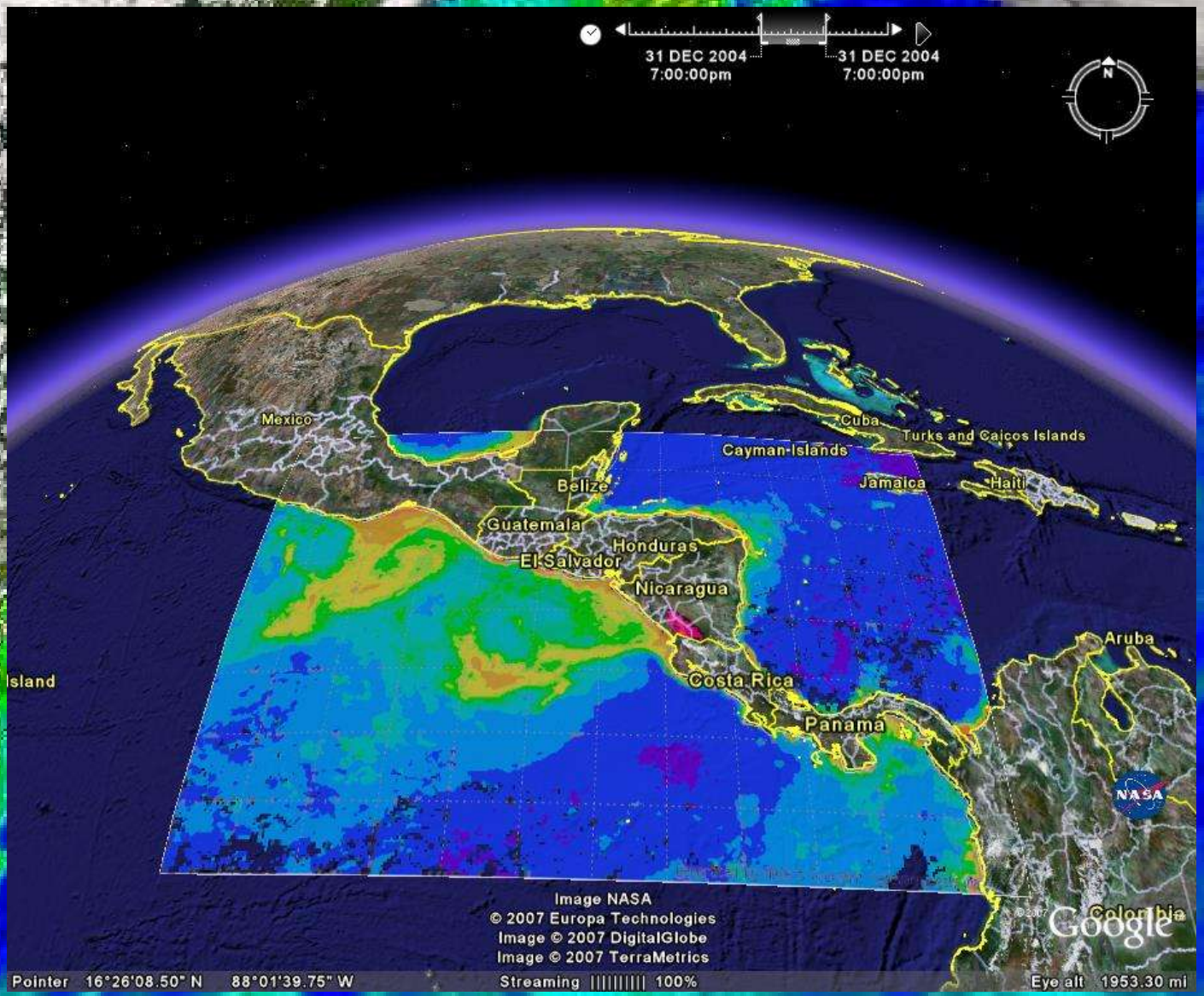
http://giovanni.gsfc.nasa.gov/

"Ocean Color Radiometry Online Visualization and Analysis")

Laboratory for Ocean Color Users (LOCUS)

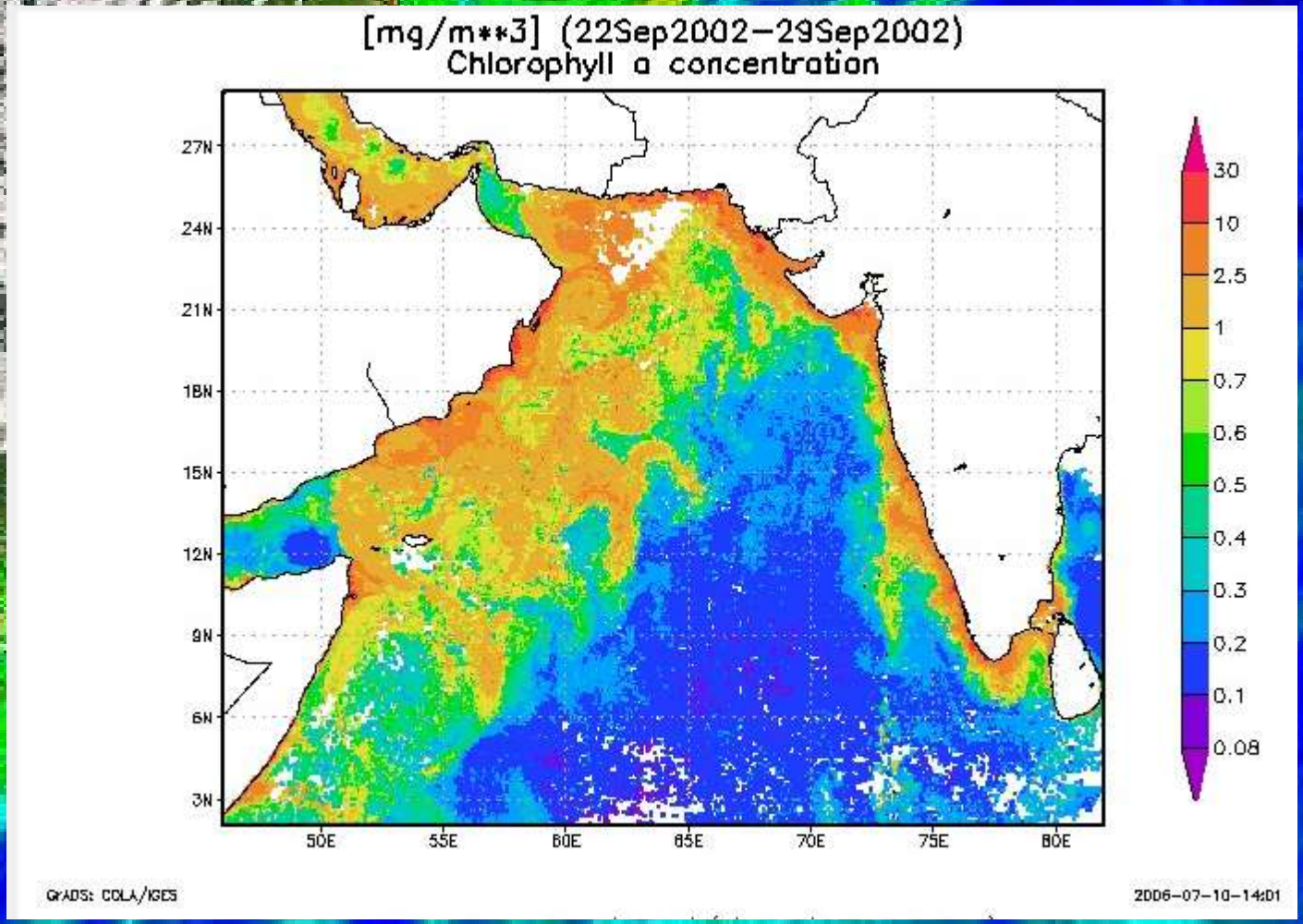
http://disc.sci.gsfc.nasa.gov/oceancolor/locus/index.shtml

An example of what the Giovanni KMZ (Google Earth) output looks like



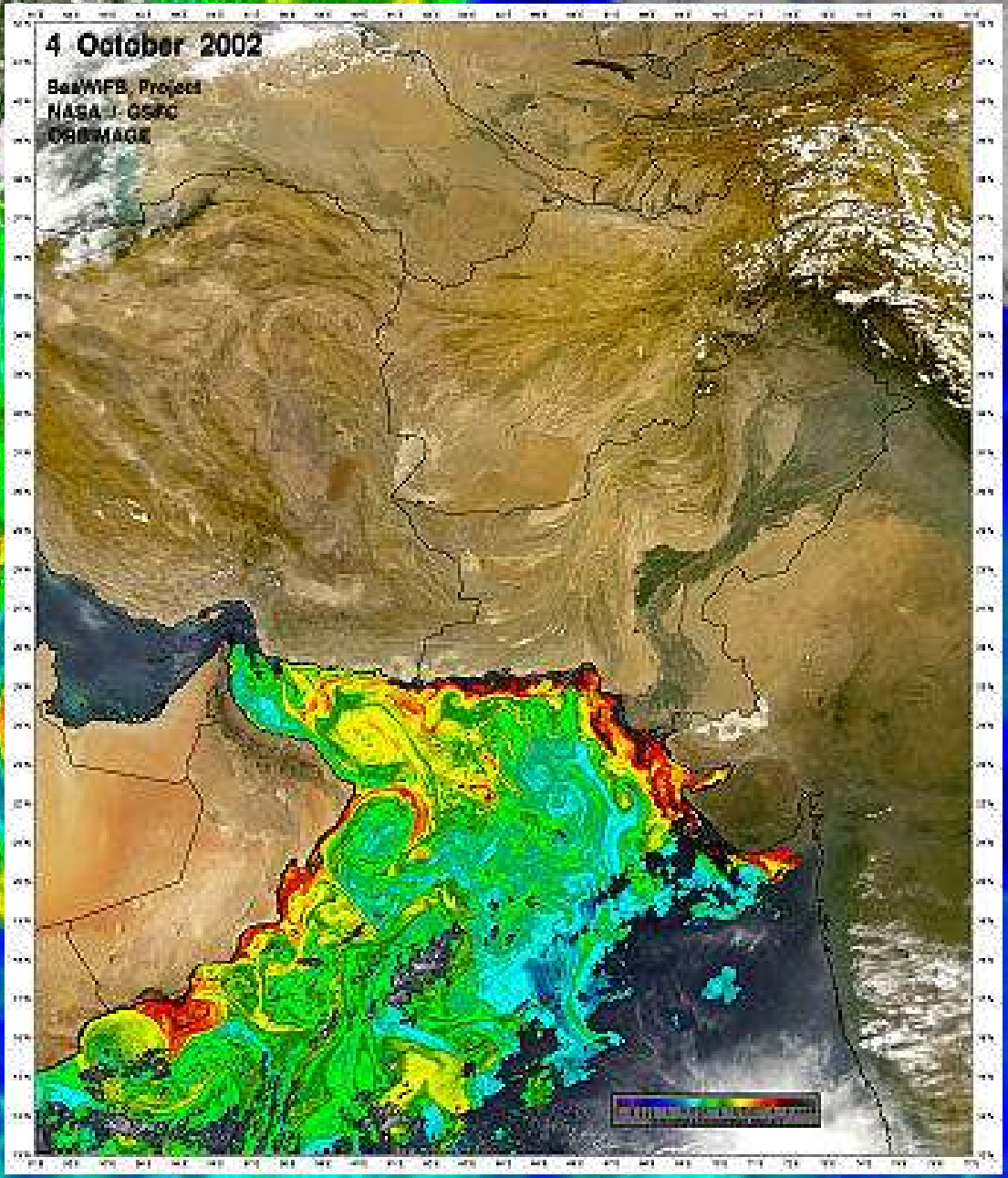
Arabian Sea Monsoon: 8-day data

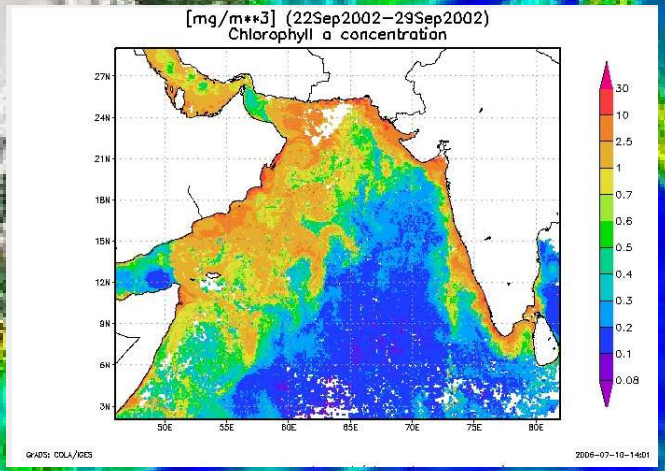
We will be creating an improved 8-day data interface as part of a new research project



This is what <u>one day</u> looks like as the Arabian Sea monsoon blooms dissipate.

This image was acquired five days after the Giovanni 8-day image shown on the previous slide (and below for comparison).





So what else is new in Giovanni?

New data sets

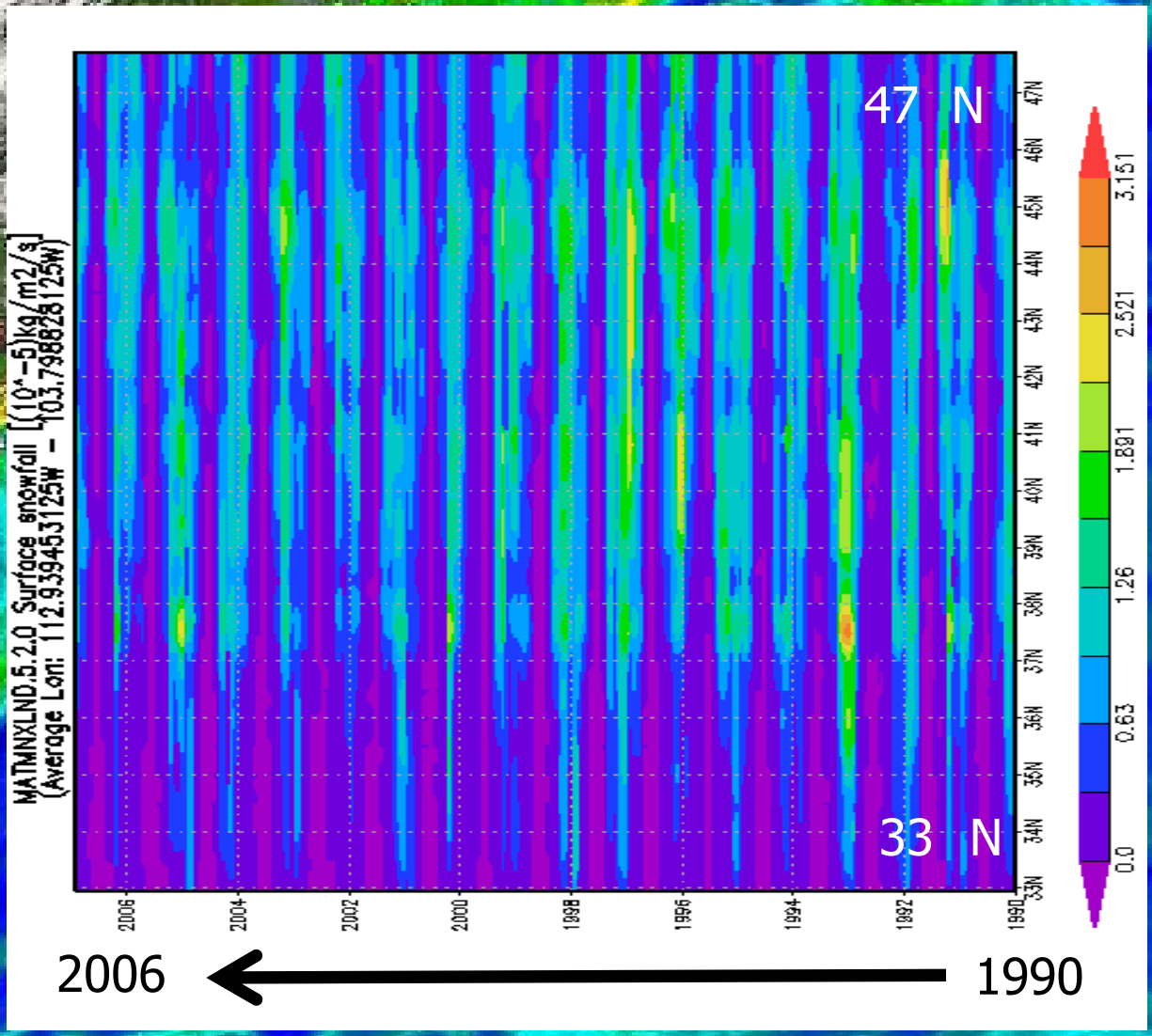
Giovanni provides data sets from NASA missions of weather- and climate-related interest, covering such topic areas as:

- **Precipitation**
- **Hydrology**
- **Atmospheric dynamics (water vapor, temperature)**
- **Atmospheric chemistry (ozone, trace gases)**
- **Atmospheric aerosols**
- **Ice and snow extent**
- **Cloud characteristics**

New Giovanni data interfaces include:

- MERRA (Modern Era Retrospective-analysis for Research and Applications – 40 years of meteorological data)
- CERES (Clouds and the Earth's Radiant Energy System)
- MAIRS (Monsoon Asia Integrated Regional Study)
- TES (Tropospheric Emission Spectrometer)

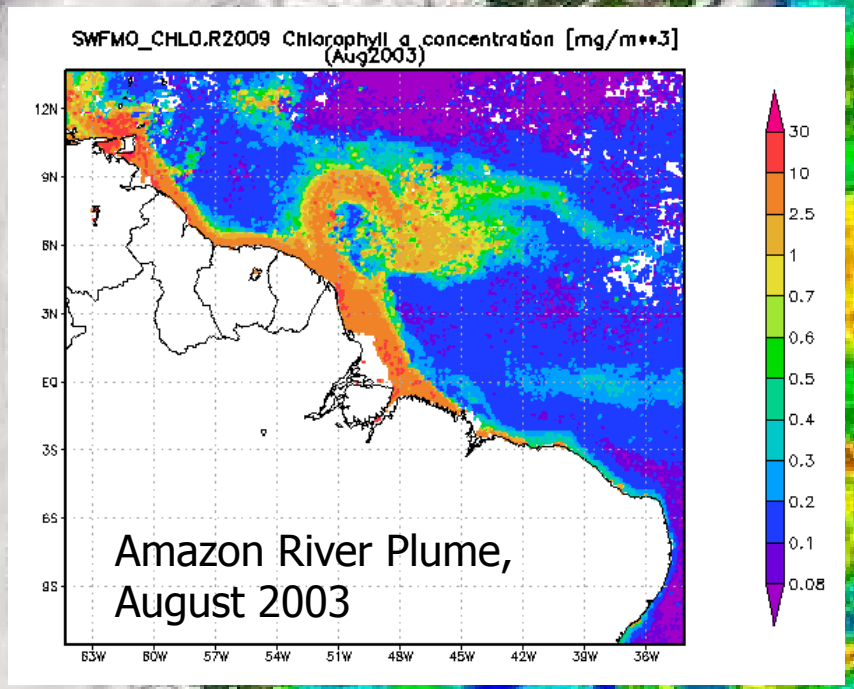
MERRA data example: Snowfall in the Rockies

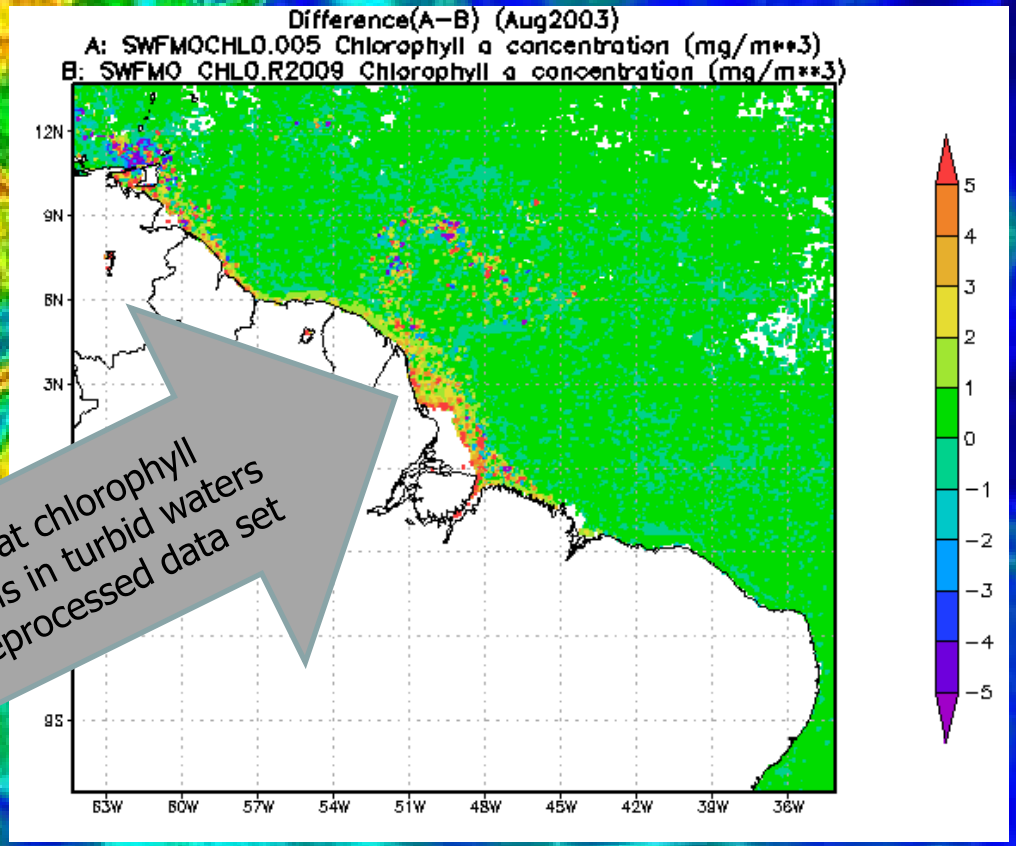


New analysis capabilities include:

- Histogram (frequency distribution)
- Correlation map
- Difference plot
- Time-series of area-averaged differences

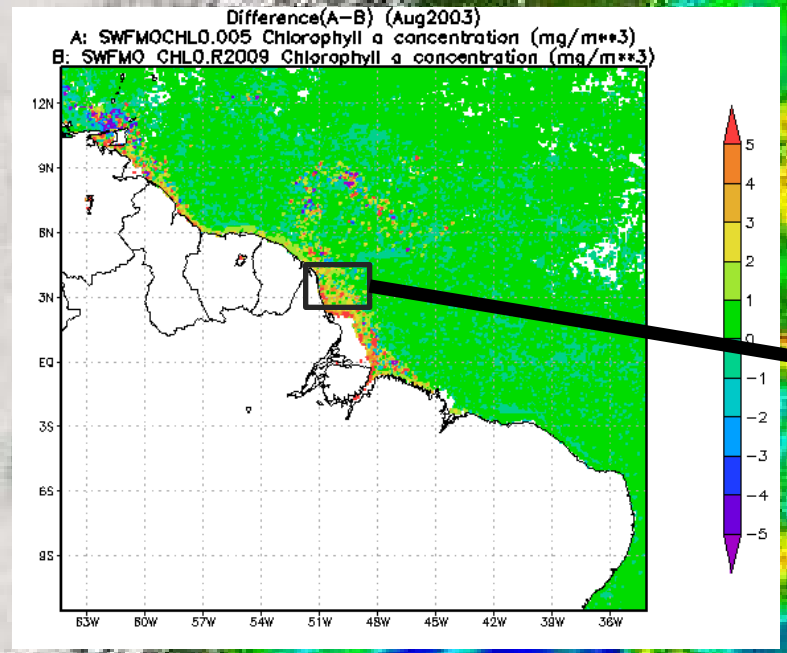
Comparison of SeaWiFS reprocessed data to previous data set

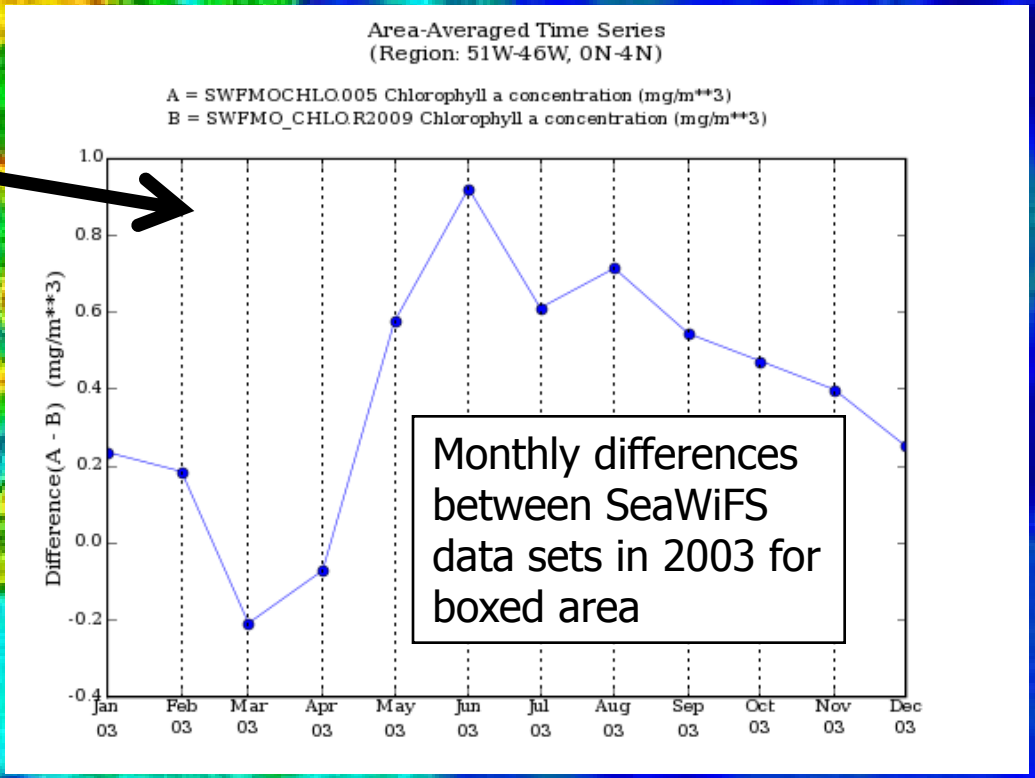




Positive values show that chlorophyll concentration retrievals in turbid waters are reduced in the reprocessed data set

Time-series of area-averaged differences






Questions?